US Army Chemical School, Ft. McClellan, ALA

DU Awareness Training

PURPOSE: To educate soldiers and leaders about depleted uranium, its uses, and ways to mitigate or prevent personal exposures

Briefing Overview

- Define DU
- General Military Uses
- DU Characteristics:
  - Radiological toxicity
  - Chemical toxicity
- Sources of DU Contamination
- Protecting yourself from DU exposures
- Operating Safely in a DU

Depleted Uranium

- **Depleted Uranium (DU) is the uranium remaining after the most radioactive isotopes have been removed to enrich other natural uranium for use as nuclear fuel or in nuclear weapons**
- **Depleted uranium is 40% less radioactive than natural uranium**
- **Natural uranium is all around us -- in the air, soil, in the food we eat, and the water we drink.**

Properties & Characteristics of DU

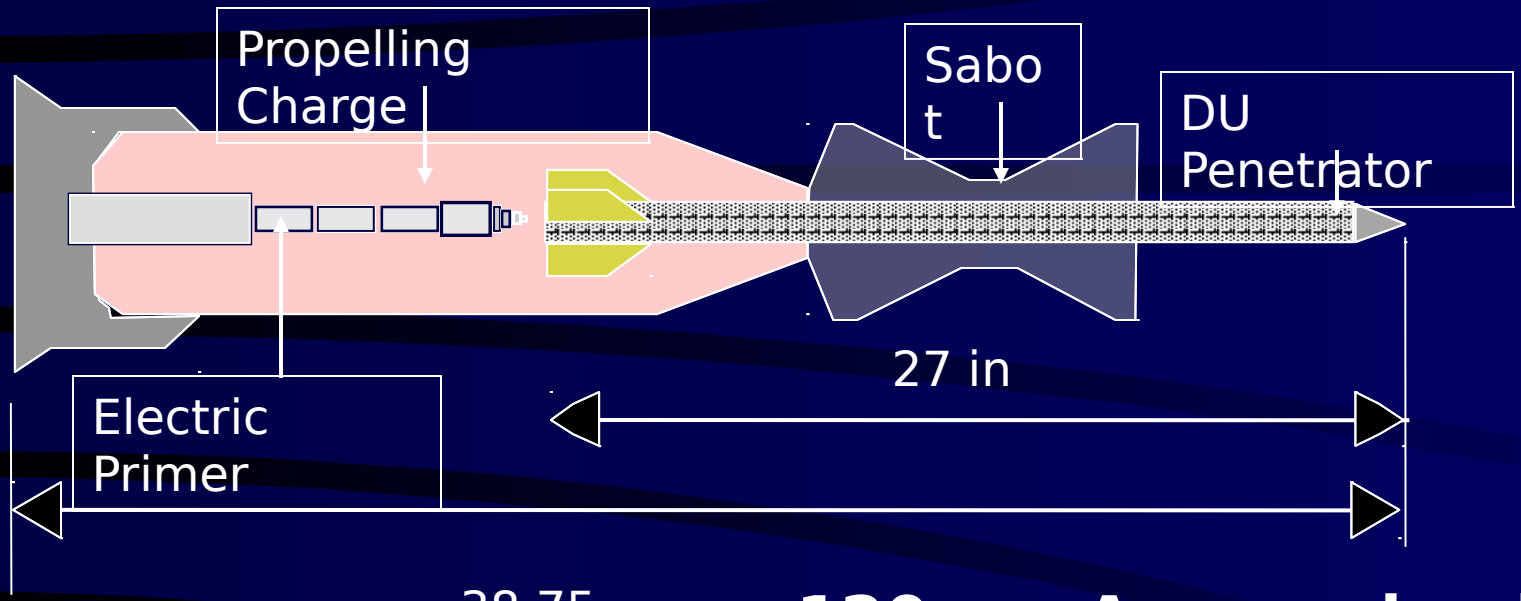
- Heavy metal (like lead, tungsten)
- 1.6 times more dense than lead
- Mildly radioactive
- Chemical toxicity (“heavy metal poisoning”)
- Highly pyrophoric (small particles can ignite spontaneously in air, especially upon impact with armor
- “Spent” DU found on the battlefield

Military Uses of DU

Depleted uranium is superior to alternative metals for:

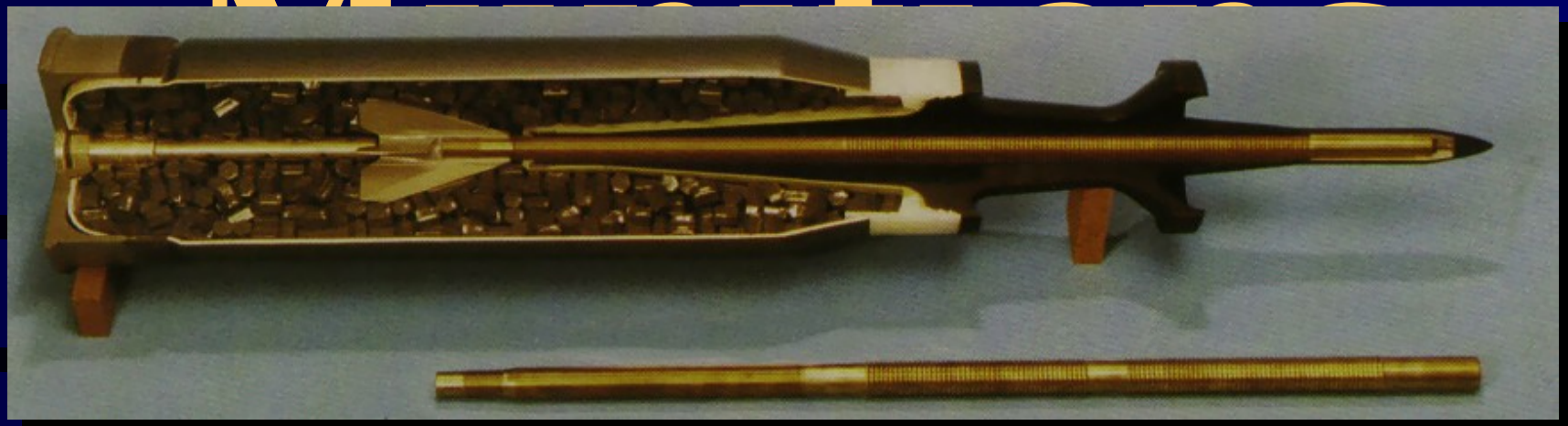
- **Armor piercing rounds (superior range and killing power)**
- **Protective armor (DU armor panels are “sandwiched” and sealed between regular steel armor**

DU Munitions



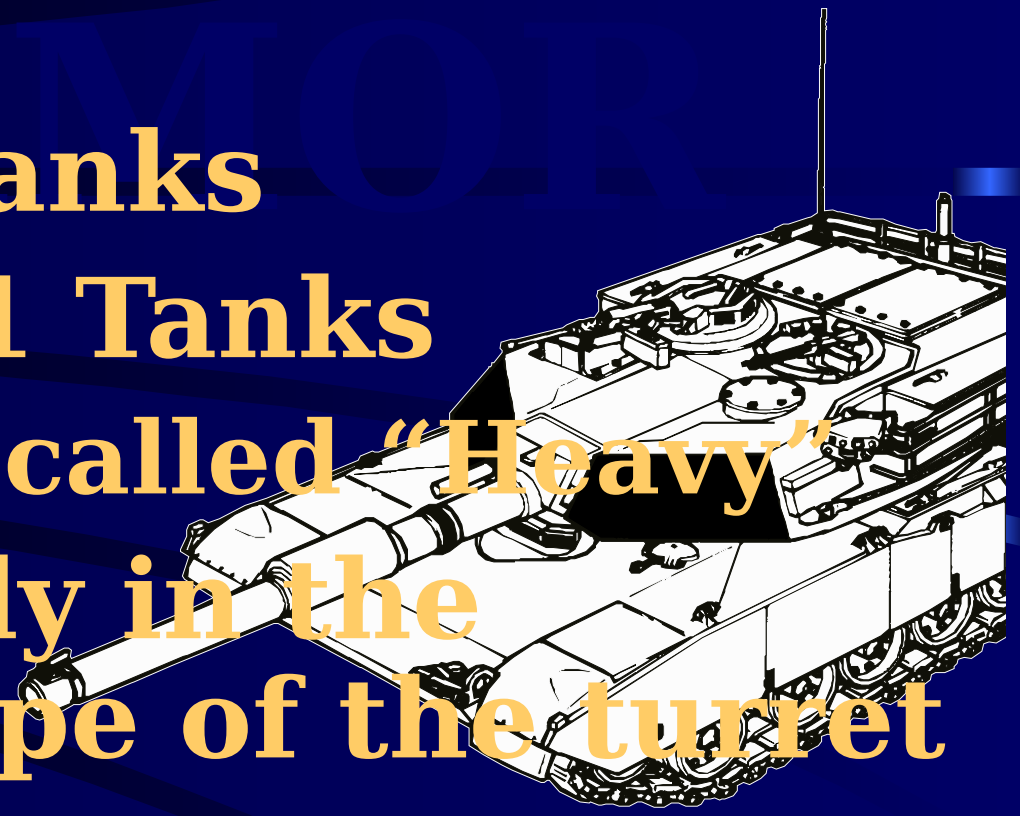
120mm Armor-piercing round with DU Penetrator

DU Munitions



105mm	120mm	25mm	30mm	155mm	Mine
M774	M827	M919	PGU-14/B	M692	M86
M833	M829		PGU-14A/B	M731	
M900	M829A1		PGU-14B/B		
	M829A2		PGU-14A/A		

- All M1A2 Tanks
- Some M1A1 Tanks
  - Commonly called "Heavy"
- Located only in the forward slope of the turret
- Detectable radiation on the outside of the turret



DU Munitions, Armor Were Extremely Effective During the Gulf War:

- **Thousands of Iraqi combat vehicles destroyed**
- **120mm DU rounds (called “Silver Bullet” by US tankers) allowed unprecedented range, lethality**

Unfortunately….

Russian T-80 Main Battle Tank

The success of DU munitions and armor has ensured its proliferation

Threat countries (e.g. Iraq) could use DU against US forces

Currently there is no better alternative to DU for both offensive and defensive purposes

US troops must be prepared to operate in a DU environment!

Operating In A DU environment

DU Contamination could be widespread on future battlefields

Knocked-out vehicles (ours and theirs) MAY be DU-contaminated

Unless you have a valid need to enter such vehicles (and take steps to protect yourself), STAY AWAY FROM THEM!!!

"STOP STUPID STUFF!"

- **Avoid knocked-out combat vehicles**
- **DON'T pick up spent DU rods with bare hands or keep them as souvenirs!**

"How hazardous is this stuff, anyway?"

Loading a sabot round

Unfired shells or intact DU armor do not exceed peacetime regulatory standards for personal exposures

The metal jacket on DU rounds (and steel armor encasing DU panels on M1 tanks) means virtually no radiation is emitted

Unfired or intact, DU DOES NOT pose a health risk!

Externally, "spent" DU poses very little exposure risk, because:

- **Alpha particles (the primary radiation type produced by DU) cannot penetrate skin and travel less than two inches**
- **Beta particles (the secondary radiation type) are blocked by BDUs, boots, etc.**
- **Gamma rays (third type produced by DU) are highly penetrating, but DU is a very weak gamma emitter**

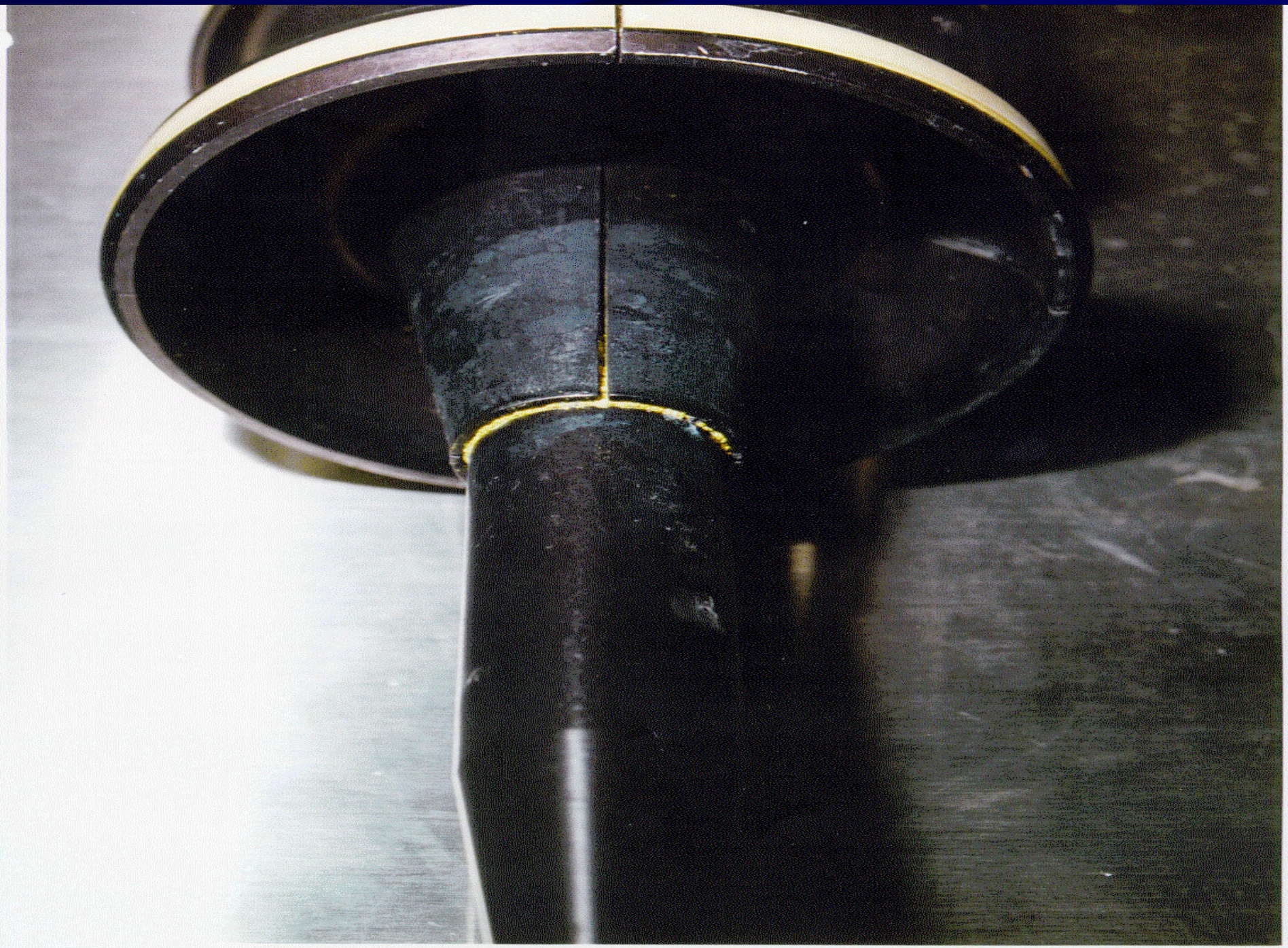
HOWEVER! ...If DU strikes armor, or burns in fires, DU oxides or residues are formed which can be internalized (inhaled, ingested, or through embedded DU fragments) by personnel

IF DU is internalized in <u>sufficient</u> quantity, adverse health effects <u>MAY</u> result due to DU's heavy metal (chemical) toxicity and low level radioactivity

Note: Skin does NOT absorb DU!

Abrams tank hit by DU

Burned DU sabot rounds at Camp Doha,Kuwait (July 1991)



DU Hazards *Inhalation*

- **Hard Target Impact**
  - 60% Respirable Particles
  - Mostly Soluble
  - High Probability of Uptake if Inhaled
- **Fire (DU Ammunition on Board)**
  - Less than 0.5% Respirable Particles
  - Mostly Insoluble
  - Low Probability of Uptake if Inhaled

"How Do I Protect Myself?"

RADCON personnel atop burned-out M1A1, Camp Doha, 1991

PROTECT YOUR AIRWAY!!!

- **Wear protective mask (gas mask, dust mask, even a wet bandana wrapped around your face) when entering damaged vehicles, or when exposed to smoke from burning vehicles.**
- **Cover exposed skin**
- **If possible, avoid the area of suspected contamination**

DU Contamination Sources

Iraqi tank hit by DU

Ammunition fire

- **Destroyed or damaged combat vehicles**
- **Burning (or burned) DU ammunition**

A small, neat hole is a tell-tale sign of a DU hit...but only a RADIAC meter can confirm DU contamination

DU Contamination (Personnel)

M1A1 Lost to Friendly Fire

Personnel in or near (< 50 m) combat vehicles at the time the vehicles are penetrated by DU munitions are at risk from DU contamination

First Aid

- **Personnel should respond to DU hazards IAW STP 21-1-SMCT.**
- **Task # 031-503-1017 (Respond to DU/LLRAM hazards.**

DU-Contaminated casualties are SAFE to handle & treat! Practice combat lifesaving FIRST!

Battlefield DU Contamination

Burned-out M1A1

- If on or near a vehicle struck by DU (or that has DU armor which has ruptured or burned), **WEAR A PROTECTIVE MASK!!**

- If you must touch the damaged vehicle **WEAR GLOVES!!**

DU on the Battlefield: The Bottom Line

- **Only go into a damaged vehicle to save lives or secure sensitive equipment.**

- **CONTINUE THE MISSION**

RESOURCES

Tier I training material

Tier I Training Support Package (TSP) TA-031-DUAT-001 “Recognize DU/LLR Hazard” and TA-031-DUAT-002, “Identify Protective Actions in a DU/LLR Contaminated Environment” can be ordered by faxing a request to Mr. Edward Hauser (ATSC) at DSN 927-4368 or (757) 878-4368.